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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,988	08/22/2001	Kenneth Lloyd Riley	GJH-0001	4445

7590 06/06/2003

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EXAMINER

ARNOLD JR, JAMES

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/869,988

Applicant(s)

RILEY ET AL.

Examiner

James Arnold, Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Amendment

The Examiner acknowledges receipt of the abstract of disclosure as required by 37 CFR 1.72(b). The Examiner also acknowledges the cancellation of claim 16 and the addition of claim 21.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-15 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawyer (EP-0 419 266) in view of Velenyi (USPN 4,808,563).

The Sawyer reference discloses a hydroprocessing process, which forms a hydrotreated product, comprising contacting a feedstock at hydroprocessing conditions with a catalyst comprised of at least one Group VIII non-noble metal and at least two Group VIB metals and the sulfides of these metals. See Page 4 lines 18-30. The reference discloses a process wherein the

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Group VIII non-noble metal is selected from Ni and Co and the Group VIB metals are selected from Mo and W. See page 4 lines 18-30. The reference discloses a process wherein the feedstock comprises at least one of naphtha, diesel, heavy gas oil, lube oil, and residuum virgin distillates. See page 8, lines 36-39. The reference discloses hydroprocessing conditions including temperatures in the range of 550 to 700 F (288 to 371 C), pressure in the range of 300 to 1200 psig (20.7 bar to 82.7 bar), hydrogen treat gas in the range of 200 to 2000 SCF/B, and a space velocity in the range of 0.5 to 4. See page 5, lines 32-40. The Sawyer reference discloses sulfiding of the catalyst in situ. Page 7, lines 45-50.

The Sawyer reference does not disclose a hydroprocessing process wherein the ratio of Group VIB metal to Group VIII non-noble metal is from about 10:1 to about 1:10. The reference does not disclose a process wherein the ratio of Mo to W is about 9:1 to about 1:9. The reference does not disclose a process wherein the bulk multimetallic is represented by the formula $(X)_b(Mo)_c(W)_dO_z$ and wherein X is a Group VIII non-noble metal, and the molar ratio of b: (c+d) is 0.5/1 to 3/1. The reference does not disclose a process comprising the step of sulfiding a multimetallic oxide precursor in order to form the bulk multimetallic catalysts, and the X-ray diffraction pattern of the catalyst is essentially amorphous with crystalline peaks at $d=2.53$ Angstroms and $d=1.70$ Angstroms. The reference does not disclose a process wherein the molar ratio of b: (c+d) is 0.75/1 to 1.5/1 and the molar ratio of c:d is $>0.01/1$. The reference does not disclose the complete numerical range of hydroprocessing conditions claimed in the application for each type of hydrocarbonaceous feedstock nor does it disclose the boiling ranges claimed in the application for each hydrocarbonaceous feedstock. The reference does not disclose a process wherein the bulk multimetallic catalyst is in the form of particles having a median diameter of at

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least 50 nm, a surface area of at least $10\text{m}^2/\text{gm}$, a pore volume ranging from 0.05 to 5 ml/g, and an absence of pores smaller than 1 nm. The reference does not disclose a process wherein the bulk multimetallic catalyst has a core-shell structure. The reference does not disclose a process further comprising contacting at least one of the feedstock and hydroprocessed product with a catalytically effective amount of a second catalyst under catalytic conversion conditions. The reference does not disclose a process wherein the second catalyst is at least one of a hydroprocessing catalyst, a cracking catalyst, and an isomerization catalyst. The reference does not disclose a process wherein the second catalyst is present in at least one of (i) a first reaction zone or zones upstream of the bulk multimetallic catalyst, (ii) a second reaction zone or zones containing the bulk multimetallic; and (iii) a third reaction zone or zones downstream of the bulk multimetallic catalyst. The reference does not disclose a process wherein said at least one Group VIII non-noble metal is selected from the group consisting of Ni and Co and the Group VIB metals are selected from the group consisting of Mo and W; and a process wherein said at least two Group VIB metals are Mo and W and the ratio of Mo to W is from about 9:1 to about 1:9.

The Velenyi reference discloses a Mo and W ratio of about 4:1 or greater to about 1:4 or less. See Abstract. The reference discloses a bulk multimetallic represented by the formula $(X)_b(\text{Mo})_c(\text{W})_d\text{O}_z$. See Abstract.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a hydroprocessing process wherein the ratio of Group VIB metal to Group VIII non-noble metal is from about 10:1 to about 1:10 and to utilize a process wherein the ratio of Mo to W is about 9:1 to about 1:9 because the use of these metals is disclosed by the Sawyer reference and it would be appropriate to use them in any combination that is effective for

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hydrotreating. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a hydroprocessing process wherein the bulk multimetallic is represented by the formula $(X)_b(Mo)_c(W)_dO_z$ and wherein X is a Group VIII non-noble metal, and the molar ratio of b: (c+d) is 0.5/1 to 3/1 because the constituents of the bulk multimetallic are disclosed by the Velenyi reference and it would be appropriate to use them in any combination effective for hydrotreating. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process comprising the step of sulfiding a multimetallic oxide precursor in order to form the bulk multimetallic catalysts, and the X-ray diffraction pattern of the catalyst is essentially amorphous with crystalline peaks at $d=2.53$ Angstroms and $d=1.70$ Angstroms because diffraction peaks represent the characteristics of the reacted metal components and because the Sawyer reference discloses sulfiding of individual transition metals and mixtures of transition metals and it discloses the use of transition metal oxides as catalysts. See Sawyer page 3, lines 19-25 and page 6 lines 18-25. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein the molar ratio of b: (c+d) is 0.75/1 to 1.5/1 and the molar ratio of c:d is $>0.01/1$ because the constituents of the bulk multimetallic are disclosed by the Velenyi reference and it would be appropriate to use them in any combination effective for hydrotreating. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the complete numerical range of hydroprocessing conditions claimed in the application for each type of hydrocarbonaceous feedstock and to utilize the boiling ranges claimed in the application for each hydrocarbonaceous feedstock because the ranges of hydroprocessing conditions overlap with the ranges disclosed by the Sawyer reference and therefore it would be appropriate to adjust

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them such that they will be effective for hydrotreating; and because the boiling ranges of individual feedstocks vary by type of feedstock and applicant admits that the boiling ranges disclosed are typical ranges for the individual types of hydrocarbonaceous feedstocks therefore it would be appropriate to utilize these feedstocks at their typical individual boiling ranges to effect hydrotreatment. Furthermore, the Sawyer reference discloses that the process conditions in the hydrotreating reactor depend on the particular feed being treated. See page 5 , line 33. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a bulk multimetallic catalyst in the form of particles having a median diameter of at least 50 nm, a surface area of at least $10\text{m}^2/\text{gm}$, a pore volume ranging from 0.05 to 5 ml/g, and an absence of pores smaller than 1 nm where the bulk multimetallic catalyst has a core-shell structure because the individual components of the bulk multimetallic are disclosed by the Velenyi reference and it would be appropriate to use the components in any form or size that would be effective for hydrotreating. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process further comprising contacting at least one of the feedstock and hydroprocessed products with a catalytically effective amount of a second catalyst under catalytic conversion conditions; a process wherein the second catalyst is at least one of a hydroprocessing catalyst, a cracking catalyst, and an isomerization catalyst; and a process wherein the second catalyst is present in at least one of (i) a first reaction zone or zones upstream of the bulk multimetallic catalyst, (ii) a second reaction zone or zones containing the bulk multimetallic; and (iii) a third reaction zone or zones downstream of the bulk multimetallic catalyst because further catalytically driven activity will enhance the end result of hydrotreatment. It would have been obvious to one having ordinary skill in the art at the time the

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invention was made to utilize a process wherein said at least one Group VIII non-noble metal is selected from the group consisting of Ni and Co and the Group VIB metals are selected from the group consisting of Mo and W; and a process wherein said at least two Group VIB metals are Mo and W and the ratio of Mo to W is from about 9:1 to about 1:9 because the individual components and different combinations are disclosed by the Velenyi and Sawyer references as being suitable for hydrotreating and it would be appropriate to adjust the combination and ratios of the components for effective hydrotreating.

Response to Arguments

Applicant's arguments have been fully considered but are deemed unpersuasive. Applicant asserts that none of the cited references describe the use of the inventive Ni-Mo-W catalyst combination. The individual components of the catalyst combination, however, are described by the cited references as being suitable for hydrotreating. See Sawyer, page 4, lines 19-27 and Velenyi, Abstract. Therefore, combining the individual components, known for their use and effectiveness in hydrotreating, to create applicant's claimed catalyst combination would be obvious to one having ordinary skill in the art. Applicant also asserts the novelty of a catalyst combination comprising two Group VI and one Group VIII component. This, however, is also an inaccurate assertion because Velenyi discloses that two or more of the Group VIII and Group VI metal components may be combined in its disclosed catalyst. See Abstract. Finally, applicant asserts that his catalyst combination results in unexpectedly high activity. Applicant, however, fails to particularly point out in his response how the combination of Ni, Mo, and W results in unexpectedly high activity. Therefore, the Examiner maintains that the teachings in the

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Sawyer and Velenyi references would suggest to one of ordinary skill in the art the process as claimed by applicant.

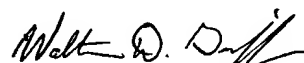
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Arnold, Jr. whose telephone number is 703-305-5308. The examiner can normally be reached on Monday-Thursday 8:30 AM-6:00 PM; Fridays from 8:30 AM-5:00 PM with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

ja
June 5, 2003



Walter D. Griffin
Primary Examiner